

Application Number 10/530533
Response to Office Action dated 02/12/2007

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Remarks

Responsive to the Detailed Action mailed 12 February 2007, Applicants submit the following amendments and remarks. Applicants amend the specification editorially. Applicants further amend claims 1 and 2. Claims 1-7 are pending.

Applicants amend claim 1 editorially to provide proper antecedent basis for the oscillation origin. This overcomes the objection to claim 1 under 35 U.S.C. §112, first paragraph.

Applicants traverse the rejection of claims 1 and 2 as being obvious over U.S. Patent No. 6,551,245 to Irioka et al. (Irioka '245) in view of U.S. Patent 4,690,150 to Mayo, Jr. (Mayo '150). Irioka '245 does not teach or suggest a detector that detects an oscillation origin of the ultrasonic element; Irioka '245 does not teach or suggest that the oscillation range is divided into two regions of a positive region and a negative region; and Irioka '245 does not teach or suggest a control of origin return based on the origin-return signal, all required by claim 1. The rejection refers to Irioka '245 at column 1 lines 45-59, which refers to a first encoder actually having two encoder units: a first encoder unit measures the angular position of a holding member, and a second encoder unit measures a preselected reference angular position of the holding member. A careful review of Irioka '245 especially at column 4 lines 32-64, however, teaches that the first encoder unit measures the displacement around the x-axis shown in Figure 2 (this measurement is accomplished by counting the number of magnetic pulses of a rotating magnetic pattern 121) and the second encoder unit measures the rotation of a magnetic member 122 that generates a signal at every 360 degrees rotation. Thus, from the number of pulses of the rotating magnetic pattern 121 from the first encoder unit during a single rotation of magnetic member 122 obtained from the second encoder unit, the angular displacement of the outer cylinder can be obtained. Irioka '245 simply does not mention any origin of oscillation; nor does Irioka '245 return the ultrasonic element to its oscillation origin. The rejection further refers to a second encoder of Irioka '245 that is not the same as the second encoder unit. The second encoder measures the displacement of the rotational angle of the drive shaft around the y-axis shown in Figure 2 (column 3 lines 42-44 and column 5 lines 43-48).

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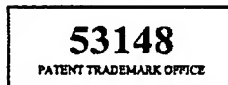
The rejection admits that Irioka '245 does not expressly disclose that a control unit controls the origin return for the ultrasonic element and relies upon Mayo '150 at columns 3 line 65-68 and column 4 lines 11-15 as providing a control unit to control the origin. Applicants disagree. Mayo '150 teaches an apparatus and a method to produce pseudocolor images on a cathode ray tube (CRT) from a diagnostic ultrasound image, and to map pixels on the CRT to points in the body from corresponding echo signals of the ultrasonic device. Mayo '150 does not teach a control of origin return for the ultrasonic element unit to the oscillation origin, as required by claim 1. Mayo '150 does not even teach an origin-return signal.

Because neither Irioka '245 nor Mayo '150 teach or suggest an origin-return signal having different logic levels depending on whether the ultrasonic element is located in a positive or a negative region, as required by claim 1, Applicants request withdrawal of the rejection of claims 1 and 2 under 35 U.S.C. §103(a) under Irioka '245 and Mayo '150.

Claims 3-5 were further rejected under 35 U.S.C. §103(a) as being obvious over Irioka '245, Mayo '150 and further in view of U.S. Patent No. 5,759,155 to Miyagawa (Miyagawa '155). Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being obvious over the combination of Irioka '245, Mayo '150, Miyagawa '155 and U.S. Patent 4,880,011 to Imade et al. (Imade '011). Neither Miyagawa '155 nor Imade '011 teach or suggest an origin-return signal and a control to return the ultrasonic element to its oscillation origin. In an ultrasonic device, Miyagawa '155 derives rotational angle information and reference position information from one signal, but makes no mention of an oscillation origin and a control of origin return. Further, Imade '011 teaches a method and an apparatus to correct for temperature drift of an ultrasonic device using the phase difference between two signals but does not discuss an origin of oscillation. Applicants are not admitting the relevance of Miyagawa '155 and Imade '011 to claims 3-7 or conceding the correctness of the rejections.

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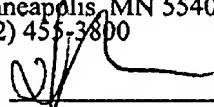
Applicants request that the rejections of the claims as being obvious over a combination of Irioka '245 and Mayo '150, a combination with Miyagawa '155, and with Imade '011 be withdrawn and that the claims be allowed. The Examiner is invited to resolve any remaining issues in a telephone conversation with the Attorney listed below.



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Respectfully submitted,

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